

ENOCH VALLEY MINE (PWS 6150044) SOURCE WATER ASSESSMENT FINAL REPORT

January 30, 2003



State of Idaho Department of Environmental Quality

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Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of the designated assessment areas and sensitivity factors associated with the well and the aquifer characteristics.

This report, *Source Water Assessment for Enoch Valley Mine, Soda Springs, Idaho*, describes the public water system (PWS), the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The Enoch Valley Mine PWS (# 6150044) is a non-community, non-transient drinking water system located in Caribou County. The well is the system's sole source of water, providing drinking water to the Enoch Valley Mining shop and office. The well is located approximately six miles southeast of Henry within the Enoch Valley. It was constructed in 1990 to a depth of 255 feet below ground surface (bgs). The water system serves approximately 75 persons through two connections.

The potential contaminant sources within the delineation capture zone of the Enoch Valley Mine Well include an unimproved road, a drainfield, a maintenance shop, an aboveground storage tank (AST), and a settling pond. If an accidental spill occurred on the unimproved road or at the maintenance shop, IOCs, VOCs, SOCs, and microbial contaminants could be added to the aquifer systems. The drainfield can potentially add IOCs and microbial contaminants to the aquifer and any leakage or spills associated with the AST can potentially add VOCs and SOCs to the aquifer. If the settling pond is not constructed correctly (with a liner and protection from flooding), it can contribute IOCs, VOCs, SOCs, and microbial contaminants to the aquifer.

Final well susceptibility scores are derived from equally weighting potential contaminant inventory/land use scores and adding them with hydrologic sensitivity and system construction scores. Therefore, a low rating in one category coupled with a higher rating in the other category results in a final rating of low, moderate, or high susceptibility. Potential contaminants are divided into four categories: IOCs (i.e., nitrates, arsenic), VOCs (i.e., petroleum products), SOCs (i.e., pesticides), and microbial contaminants (i.e., bacteria). As a well can be subject to various contamination settings, separate scores are given for each type of contaminant.

For the assessment, a review of laboratory tests was conducted using the State Drinking Water Information System (SDWIS). No total coliform bacteria have been detected in the system thus far. No SOCs have been detected in the well water. The IOCs barium and fluoride have been detected in the well water but at concentrations below the maximum contaminant level (MCL) for each chemical, as established by the EPA.

The VOC trichloroethylene (TCE) was detected in November 2000 at concentrations of 1.5 micrograms per liter ($\mu\text{g/L}$) (MCL is 5.0 $\mu\text{g/L}$). However, the sample was taken from a contaminated spigot used for solvents in the truck lube bay, an indication that the VOC contamination did not originate from the well source.

Another sample was taken (with the supervision of the Health Department) at the well source in January 2001. No TCE was detected at that time.

In terms of total susceptibility, the well rated moderate for IOCs, VOCs, SOCs, and microbial contaminants. Hydrologic sensitivity rated moderate and the system construction rated high for the Enoch Valley Mine Well. Potential contaminant land use scores were moderate for IOCs, VOCs, and SOCs, and low for microbials.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well or spring sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For the Enoch Valley Mine, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system’s components and its capacity). As land uses within most of the source water assessment areas are outside the direct jurisdiction of the Enoch Valley Mine, collaboration and partnerships with state and local agencies and industry groups should be established and are critical to success. Educating employees about source water will further assist the system in its monitoring and protection efforts.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan. Public education topics could include household hazardous waste disposal methods and the importance of water conservation. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Caribou County Soil Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g. zoning, permitting) or non-regulatory in nature (i.e., good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR ENOCH VALLEY MINE SODA SPRINGS, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this assessment means.** Maps showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are included. The list of significant potential contaminant source categories and their rankings used to develop the assessment also is included.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the well, and aquifer characteristics. All assessments must be completed by May of 2003. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water supply system is not possible. **This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the public water system (PWS).**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a PWS once it has been contaminated. DEQ encourages water systems to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the water system based on its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The Enoch Valley Mine PWS (# 6150044) is a non-community, non-transient drinking water system located in Caribou County (Figure 1). The well is the system's sole source, providing drinking water to the Enoch Valley Mining shop and office. The well is located approximately six miles southeast of Henry within the Enoch Valley. It was constructed in 1990 to a depth of 255 feet below ground surface (bgs). The water system serves approximately 75 persons through two connections.

No total coliform bacteria have been detected in the system thus far. No synthetic organic chemicals (SOCs) have been detected in the well water. The inorganic chemicals (IOCs) barium and fluoride have been detected in the well water but at concentrations below the maximum contaminant level (MCL) for each chemical, as established by the EPA.

The volatile organic chemical (VOC) trichloroethylene (TCE) was detected in November 2000 at concentrations of 1.5 micrograms per liter ($\mu\text{g/L}$) (MCL is $5.0 \mu\text{g/L}$). However, the sample was taken from a contaminated spigot used for solvents in the truck lube bay, an indication that the VOC contamination did not originate from the well source. Another sample was taken (with the supervision of the Health Department) at the well source in January 2001. No TCE was detected at that time.

Defining the Zones of Contribution – Delineation

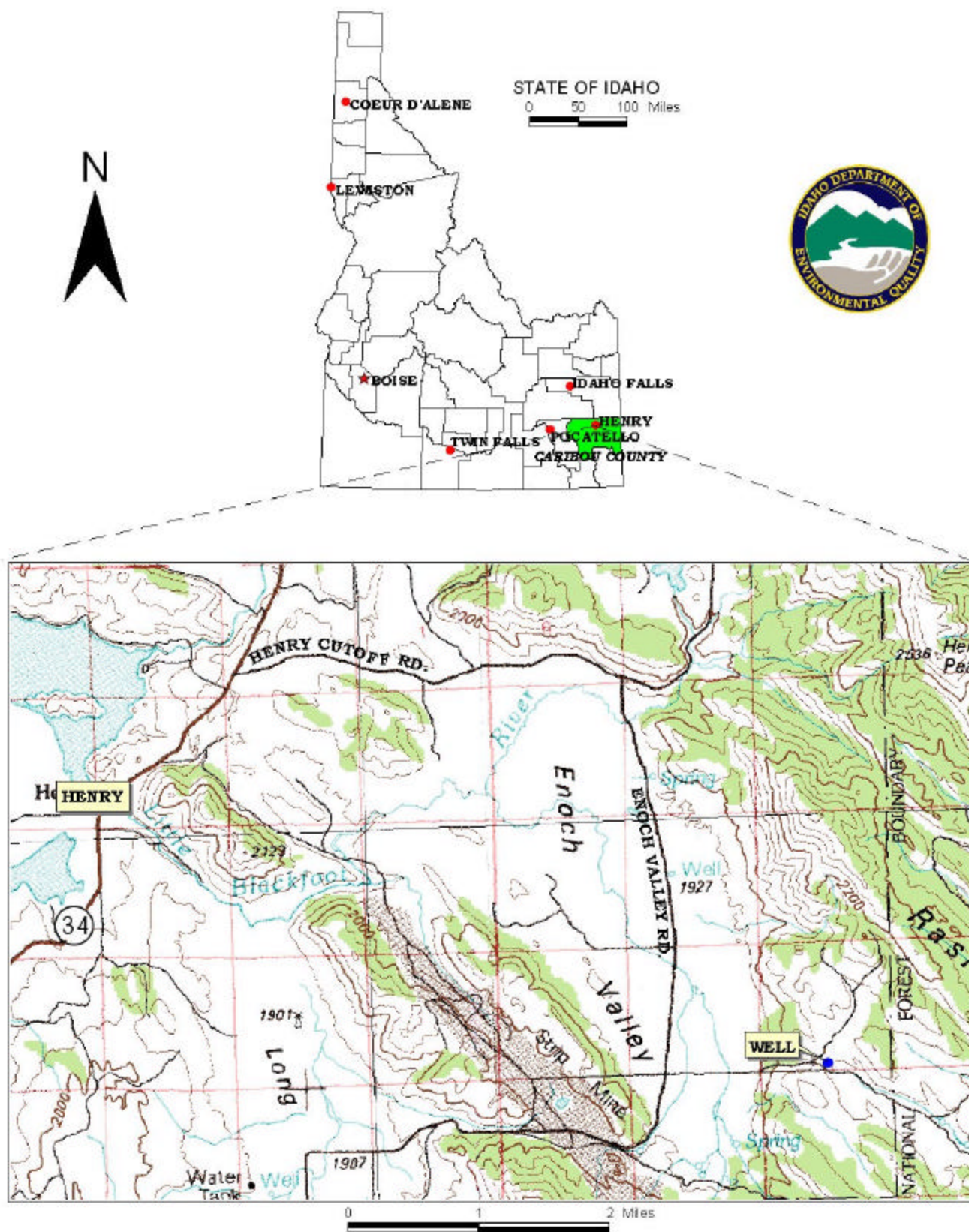
The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a flowing well) for water in the aquifer. Washington Group International (WGI) was contracted by DEQ to define the PWS's zones of contribution. WGI used a calculated fixed radius model approved by the Source Water Assessment Plan (DEQ, 1999) in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT zones for water associated with the “None” hydrologic province in the vicinity of the Enoch Valley Mine. The computer model used site specific data, assimilated by WGI from a variety of sources including operator records and hydrogeologic reports. A summary of the hydrogeologic information from the WGI is provided below.

Hydrogeologic Conceptual Model

Graham and Campbell (1981) identified and described 70 regional ground water systems throughout Idaho. Thirty-four of these fall within the southeastern part of the state. The “None” hydrologic province, as defined in this report, includes all the area outside of the 34 regional systems in southeast Idaho. The smaller and more localized aquifers in the “None” province typically are situated in the foothills and mountains that surround and recharge the regional ground water systems.

The mountains and valleys within the “None” hydrologic province were formed during two events separated by approximately 50 to 70 million years (Alt and Hyndman, 1989, pp. 329 and 336). The overthrust belt of the northern Rocky Mountains was formed roughly 70 to 90 million years ago through the intrusion of granitic magma and a massive eastward movement of large slabs of layered sedimentary rocks along faults that dip shallowly westward (Alt and Hyndman, 1989, p. 329). This movement caused extreme folding and fracturing of the sedimentary and granitic rocks and, in many cases, left older formations lying on top of younger ones.

FIGURE 1. Geographic Location of the Enoch Valley Mine



Later Basin and Range block faulting broke up the largely eroded Rocky Mountains into large uplifted and downthrown blocks resulting in the present day northwest trending mountains and valleys seen throughout southeast Idaho. Paleozoic and Precambrian limestone, dolomite, sandstone, shale, siltstone, and quartzite are the predominant materials forming the mountains and probably compose the bedrock underlying the valleys between Salmon, Idaho on the north side of the Snake River Plain and Franklin, Idaho near the Utah/Idaho border (Dion, 1969, p.18; Kariya et al., 1994, p. 6; Bjorklund and McGreevy, 1971, p. 12; and Parlman, 1982, p. 9).

Groundwater movement in the mountains is primarily through a system of solution channels, fractures and joints that commonly transmit water independently of surface topography (Bjorklund and McGreevy, 1971, p. 15; Dion, 1969, p. 18). Ralston and others (1979, pp. 128-129) state that the geologic structural features also can contribute to the development of cross-basin ground water flow systems. Ground water entering a geologic formation tends to follow the formation because hydraulic conductivities are greater parallel to the bedding planes than across them. Synclines and anticlines provide structural avenues for ground water flow under ridges from one valley to another.

The average annual precipitation in the mountains of southeast Idaho ranges from 20 inches on ridges near Soda Springs to over 45 inches on the Bear River Range (Ralston and Trihey, 1975, p. 7, and Dion, 1969, p. 11). The valleys receive an average of 7 to 10 inches annually (Donato, 1998, p. 3, and Dion, 1969, p. 11). Precipitation and seepage from streams are the primary source of recharge to the mountain aquifers (Kariya, et al., 1994, p. 18, and Parlman, 1982, p. 13).

Groundwater discharge occurs as springs and seeps issuing from faults, fractures, and solution channels and as underflow to regional aquifers. The Bear River Basin in the far southeast corner of the state contains hundreds of springs issuing primarily from fractures and solution openings in the bedrock mountains (Dion, 1969, p. 47, and Bjorklund and McGreevy, 1971, pp. 34-35). Within Cache Valley many springs discharge from the valley-fill deposits (Kariya et al., 1994, p. 32).

There is little available information on the distribution of hydraulic head and the hydraulic properties of the aquifers in the "None" hydrologic province. No U.S. Geological Survey (2001) or Idaho Statewide Monitoring Network (Neely, 2001) wells are located in the areas of concern to provide information on ground water flow direction and hydraulic gradient or to aid in model calibration. The information that is available indicates that the hydraulic properties are quite variable, even within a specific rock type. Ralston and others (1979, p. 31), for example, present hydraulic conductivity estimates for fractured chert ranging from 2.2 to 75 feet per day (ft/day). Estimates for phosphatic shale are as low as 0.07 ft/day (unfractured) and as high as 25 ft/day (fractured).

Calculated Fixed-Radius Method

The Enoch Valley Mine Well is completed in a “broken rock” aquifer assumed to be basalt. The capture zone radii were calculated using a hydraulic conductivity of 10 ft/day. The hydraulic conductivity was estimated by analysis of specific capacity data from the well using the method of Walton (1962, p. 12; see p. B-3). The effective porosity and hydraulic gradient are the default values presented in Table F-3 of the Idaho Wellhead Protection Plan for Columbia River Basalts and mixed volcanic and sedimentary rocks, primarily volcanic rocks, respectively (IDEQ, 1997, p. F-6). These values were chosen to maintain conservatism in the fixed-radius calculation since the type of aquifer is unknown. The aquifer thickness is the saturated open interval of the well. The pumping rate is 1.5 times the population served by the well (75) times the per capita consumption rate of a nearby mining well (PWS #6150018; 5 gallons per day (gal/day)).

The calculated fixed-radius method (IDEQ, 1997 p. 4-9) was used to delineate capture zones for PWS wells in the “None” hydrologic province. The fixed radii for the 3-, 6-, and 10-year capture zones were calculated using equations presented by Keely and Tsang (1983) for the velocity distribution surrounding a pumping well. This method was selected because the ground water flow systems in the mountains of southeast Idaho are typically very complex and poorly characterized. Ground water infiltrating into folded, faulted, and fractured bedrock formations may recharge shallow localized systems with short flow paths and residence times or it may enter deeper intermediate or regional systems with longer flow paths and residence times.

Unfortunately, there generally are no water level data with which to determine the flow direction and hydraulic gradient in the different aquifers. In the absence of water level data, the ground water flow direction and hydraulic gradient may differ greatly from one flow system to another, because of the existence of structural controls and heterogeneity.

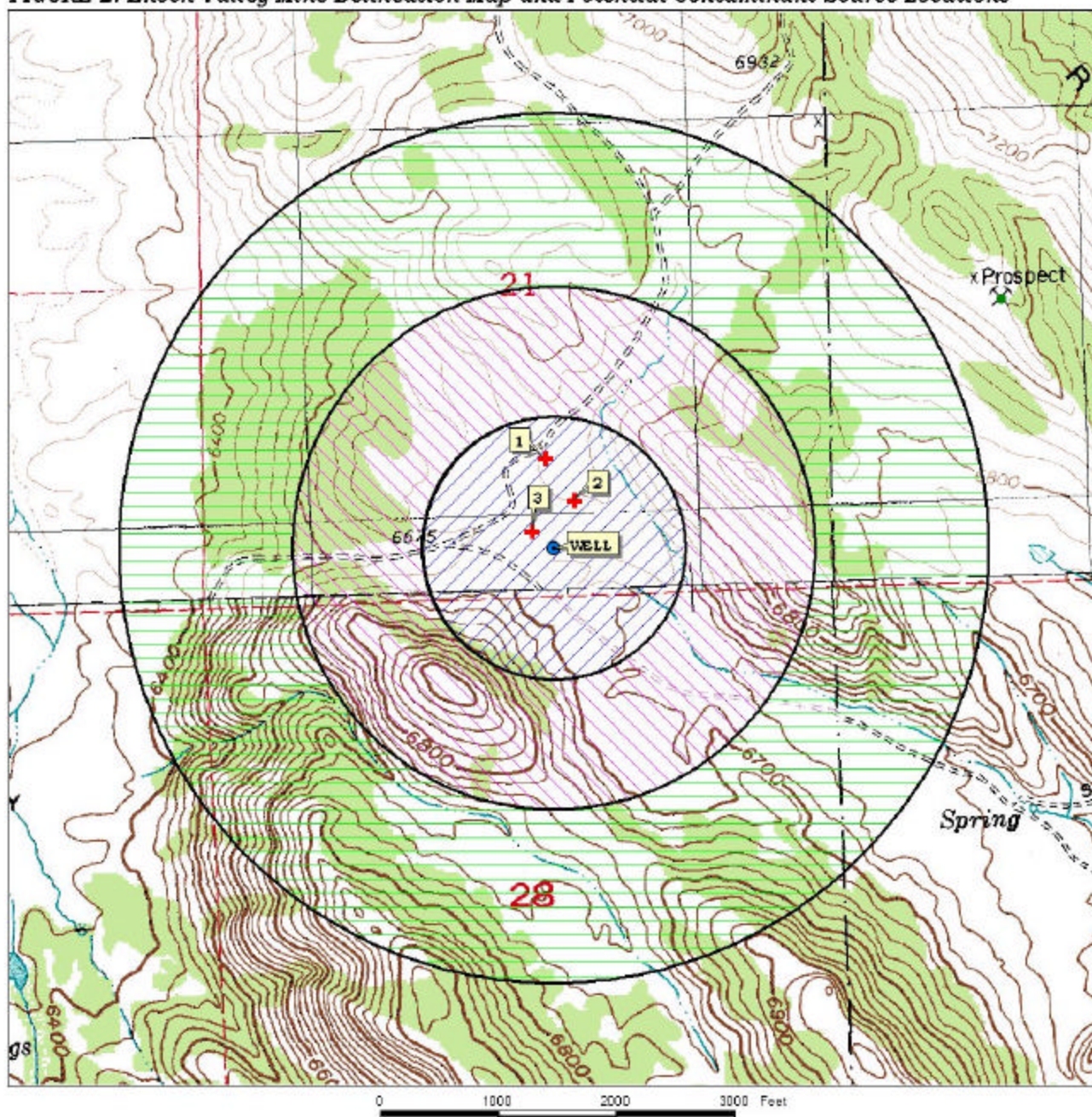
Application of the final calculated fixed-radius method to PWS wells in the “None” hydrologic province resulted in circular delineations ranging from 9.1 to 971 acres in total area. The total area of the Enoch Valley Mine Well delineation is 970 acres.

The delineated source water assessment area for the Enoch Valley Mine Well can be described as three concentric circles, 1,108 feet in diameter (3-year TOT), 2,206 feet in diameter (6-year TOT) and 3,668 feet in diameter (10-year TOT) (Figure 2). The actual data used by WGI in determining the source water assessment delineation area is available from DEQ upon request.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act. Furthermore, these sources have a sufficient likelihood of releasing such contaminants into the environment at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. Field surveys conducted by DEQ and reviews of available databases identified potential contaminant sources within the delineated areas.

FIGURE 2. Enoch Valley Mine Delineation Map and Potential Contaminant Source Locations



PWS# 6150044
WELL

It is important to understand that a release may never occur from a potential source of contamination provided they are using best management practices. Many potential sources of contamination are regulated at the federal level, state level, or both, to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, including educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply source.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted in August and September 2002. The first phase involved identifying and documenting potential contaminant sources within the Enoch Valley Mine source water assessment area through the use of computer databases and Geographic Information System (GIS) maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to identify and add any additional potential sources in the delineated areas. This task was undertaken with the assistance of the Safety/Environmental Director, Bob Peterson. Through the enhanced inventory, three additional potential contaminant sources were found within the delineated source water area. A map with the well location, delineated areas, and potential contaminant sources are provided with this report (Figure 2).

The potential contaminant sources within the delineation capture zone of the Enoch Valley Mine Well include an unimproved road, a drainfield, a maintenance shop, an aboveground storage tank (AST), and a settling pond. If an accidental spill occurred on the unimproved road or at the maintenance shop, IOCs, VOCs, SOCs, and microbial contaminants could be added to the aquifer systems. The drainfield can potentially add IOCs and microbial contaminants to the aquifer and any leakage or spills associated with the AST can potentially add VOCs and SOCs to the aquifer. If the settling pond is not constructed correctly (with a liner and protection from flooding), it can contribute IOCs, VOCs, SOCs, and microbial contaminants to the aquifer. Table 1 lists the potential contaminants within the delineation of the Enoch Valley Mine Well.

Table 1. Enoch Valley Mine Well, Potential Contaminant Inventory

Site #	Source Description ¹	TOT Zone ² (years)	Source of Information	Potential Contaminants ³
1	AST	0-3	Enhanced Inventory	VOC, SOC
2	Maintenance Shop	0-3	Enhanced Inventory	IOC, VOC, SOC
3	Drainfield	0-3	Enhanced Inventory	IOC, Microbials
	Unimproved Road	0-3, 3-6, 6-10	GIS Map	IOC, VOC, SOC, Microbials

¹ AST = Above-ground storage tank

² TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead

³ IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Section 3. Susceptibility Analysis

The well's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic sensitivity, well construction, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for the well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Attachment A contains the susceptibility analysis worksheet. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors: surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone (aquitar) above the producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination.

Hydrologic sensitivity was rated moderate for the Enoch Valley Mine Well (Table 2). This is based upon moderate to well drained soil classes defined by the National Resource Conservation Service (NRCS). Soils that have poor to moderate drainage characteristics have better filtration capabilities than faster draining soils. The vadose zone is made up of mostly clay layers and an aquitar consisting of 178 feet of cumulative clay layers is present above the producing zone. In addition, the depth to first ground water was found at 189 feet bgs.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capacity. If the wellhead and surface seal are maintained to standards, as outlined in sanitary surveys, then contamination down the well bore is less likely. If the well is protected from surface flooding and is outside the 100-year floodplain, then contamination from surface events is reduced.

The Enoch Valley Mine Well was constructed in 1990 to a depth of 255 feet bgs. According to well log information, a 0.250-inch thick, ten-inch casing is set at 235 feet bgs into "hard rock." The annular seal extends down to 20 feet bgs into "clay." The static water level is found at 137 feet bgs and the casing is perforated from 175 feet bgs to 235 feet bgs.

The system construction score of the Enoch Valley Mine Well was rated high susceptibility to contamination (Table 2). The 1998 sanitary survey indicates that the wellhead and surface seals are maintained to standards but that the wellhead does not have a well casing vent. The purpose of the vent is to vent the space between the casing and the column and prevent a vacuum from forming when the pump turns on and draws down the water table. A vacuum could draw in contamination through joints or leaks in the casing or cause the well to slough. The annular seal extends to a low permeability layer. However, the casing extends to “hard rock” which could be cracked, allowing contaminants to seep through to the aquifer. The highest production zone (the perforated portion of the casing) is not at least 100 feet below the water table. However, the well is located outside a 100-year floodplain. Additionally, the well is highly protected: barricaded and covered with a metal culvert and a locking lid.

The Idaho Department of Water Resources (IDWR) *Well Construction Standards Rules (1993)* require all PWSs to follow DEQ standards. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works (1997)* during construction. Under current standards, all PWS wells are required to have a 50-foot buffer around the wellhead and if the well is designed to yield greater than 50 gallons per minute (gpm) a minimum of a 6-hour pump test is required. These standards are used to rate the system construction for the well by evaluating items such as condition of wellhead and surface seal, whether the casing and annular space is within consolidated material or 18 feet below the surface, the thickness of the casing, etc. If all criteria are not met, the public water source does not meet the IDWR Well Construction Standards. In this case, a ten-inch casing requires a casing thickness of 0.365 inches. Therefore, the Enoch Valley Mine Well was given an additional point for not meeting system construction standards.

Potential Contaminant Source and Land Use

The well rated moderate for IOCs (i.e., nitrates, arsenic), VOCs (i.e., petroleum products), and SOC (i.e., pesticides), and it rated low for microbial contaminants (i.e., bacteria). All of the potential contaminant sources surrounding the well were in the 3-year TOT zone and many of them contained leachable IOCs, VOCs, and SOC, contributing to land use scores. The land use within the delineation of the well was classified as rangeland or woodland, lowering the land use score. Even though the herbicide use in Caribou County is considered high, agricultural land is downgradient and at least one mile away from the Enoch Valley Mine Well.

Final Susceptibility Ranking

A detection above a drinking water standard MCL, any detection of a VOC or SOC, or a confirmed microbial detection at the wellhead will automatically give a high susceptibility rating to the well, despite the land use of the area, because a pathway for contamination already exists. Additionally, potential contaminant sources within 50 feet of a well will automatically lead to a high susceptibility rating. Having multiple potential contaminant sources in the 0- to 3-year TOT zone (Zone 1B) contributes greatly to the overall ranking.

Table 2. Summary of Enoch Valley Mine Susceptibility Evaluation

Drinking Water Sources	Susceptibility Scores ¹									
	Hydrologic Sensitivity	Potential Contaminant Inventory and Land Use				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well	M	M	M	M	L	H	M	M	M	M

¹H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Susceptibility Summary

In terms of total susceptibility, the well rated moderate for IOCs, VOCs, SOCs, and microbial contaminants. Hydrologic sensitivity rated moderate and the system construction rated high for the Enoch Valley Mine Well. Potential contaminant land use scores were moderate for IOCs, VOCs, and SOCs, and low for microbials.

No total coliform bacteria have been detected in the system thus far. No SOCs have been detected in the well water. The IOCs barium and fluoride have been detected in the well water but at concentrations below the MCL for each chemical, as established by the EPA.

The VOC TCE was detected in November 2000 at concentrations of 1.5 µg/L (MCL is 5.0 µg/L). However, the sample was taken from a contaminated spigot in the truck lube used for solvents, an indication that the VOC contamination did not originate from the well source. Another sample was taken (with the supervision of the Health Department) at the well source in January 2001. No TCE was detected at that time.

Section 4. Options for Drinking Water Protection

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well or spring sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For the Enoch Valley Mine, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system’s components and its capacity). As land uses within most of the source water assessment areas are outside the direct jurisdiction of the Enoch Valley Mine, collaboration and partnerships with state and local agencies and industry groups should be established and are critical to success. Educating employees about source water will further assist the system in its monitoring and protection efforts.

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A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g., zoning, permitting) or non-regulatory in nature (i.e., good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the DEQ or the Idaho Rural Water Association.

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Pocatello Regional DEQ Office (208) 236-6160

State DEQ Office (208) 373-0502

Website: <http://www.deq.state.id.us>

Water suppliers serving fewer than 10,000 persons may contact Melinda Harper (mlharper@idahoruralwater.com), Idaho Rural Water Association, at (208) 343-7001 for assistance with drinking water protection (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLA – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as Superfund is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100-year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25% of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RCRA – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

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Attachment A

Enoch Valley Mine

Susceptibility Analysis
Worksheet

Susceptibility Analysis Formulas

Formula for Well Sources

The final scores for the susceptibility analysis were determined using the following formulas:

- 1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)
- 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

1. System Construction

SCORE

Drill Date	6/1/90	
Driller Log Available	YES	
Sanitary Survey (if yes, indicate date of last survey)	YES	1998
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	NO	1
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	NO	1
Well located outside the 100 year flood plain	YES	0

Total System Construction Score 5

2. Hydrologic Sensitivity

Soils are poorly to moderately drained	NO	2
Vadose zone composed of gravel, fractured rock or unknown	NO	0
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	YES	0

Total Hydrologic Score 3

3. Potential Contaminant / Land Use - ZONE 1A

IOC Score	VOC Score	SOC Score	Microbial Score
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Land Use Zone 1A	RANGELAND, WOODLAND, BASALT	0	0	0	0
Farm chemical use high	YES	0	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		0	0	2	0

Potential Contaminant / Land Use - ZONE 1B

Contaminant sources present (Number of Sources)	YES	3	4	4	2
(Score = # Sources X 2) 8 Points Maximum		6	8	8	4
Sources of Class II or III leacheable contaminants or	YES	3	4	4	
4 Points Maximum		3	4	4	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0

Total Potential Contaminant Source / Land Use Score - Zone 1B 9 12 12 4

Potential Contaminant / Land Use - ZONE II

Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	

Potential Contaminant Source / Land Use Score - Zone II 3 3 3 0

Potential Contaminant / Land Use - ZONE III

Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	

Total Potential Contaminant Source / Land Use Score - Zone III 2 2 2 0

Cumulative Potential Contaminant / Land Use Score 14 17 19 4

4. Final Susceptibility Source Score

11 11 12 10

5. Final Well Ranking

Moderate Moderate Moderate Moderate